Seth Ausubel

01/24/02 02:40 PM

To: John Prince/R2/USEPA/US@EPA, Michael Scorca/R2/USEPA/US@EPA, Michael Sivak/R2/USEPA/US@EPA

cc:

Subject: Hg DNAPL - Summary & course of action for Ventron Site

I'm looking for your feedback on this, in particular (John), regarding course of action. Mike - I included contact info. below for the people I spoke to about particular sites. If you have more questions, I encourage you to call them (I'd be happy to join in too).

In summary, while elemental liquid mercury (Hg-o) is generally not mobile in soil, it is clear that it may be mobile under certain circumstances, and thus can act as a DNAPL. Hg-o has been observed at high concentrations in the form of beads in surface and subsurface soils at NPL sites. Hg-o's high surface tension causes it to form beads, and may explain why it does not tend to saturate soil pore space as organic DNAPLs do. The high surface tension and high affinity for soil particles generally inhibits mobility in soils. Conversely, its high density tends to encourage downward movement independent of the direction of groundwater flow. Soil disturbance, for example by subsurface borings, may facilitate Hg-o movement, by providing a conduit by which beads of Hg-o may move downward. Also, it is likely that pore spaces in sandy soils are sufficiently large to allow Hg-o downward movement. This may be facilitated by water infiltration displacing Hg-o from available pore spaces.

The following is a site-specific summary. Note that this represents only a handful of sites where, potentially, Hg DNAPL may occur.

ALCOA/Lavaca Bay Superfund Site, Calhoun County, TX. Contact: Gary Baumgarten, RPM, EPA Region 6; 214-665-6749. Beads of Hg-o were found in surface and subsurface soils around a former chlor-alkali process area. The Hg-o in subsurface soils was associated with well bottoms, and the RPM speculated that the wells created a pathway for downward migration. The state was concerned that the Hg-o could continue to migrate toward Lavaca Bay. The RPM felt that this could potentially occur in sandy soils, gravels, or along rootlets. A subsurface evaluation, however, did not find suitable pathways for further migration.

LCP Bridge Street Sub-Site of the Onondaga Lake Superfund Site, Solvay, NY. Contact: Bob Nunes, RPM, EPA Region 2; x7-4254. September 2000 ROD. Hg-o beads were found in surface and subsurface (18-50' bgs) soils at concentrations as high as 19,200 ppm in the vicinity of a former mercury cell building. The highest GW Hg concentrations (up to 260 ppb) were found in deep monitoring wells screened within soil containing Hg-o. It is believed that the Hg-o migrated downward through geotechnical borings done in the 1950s that penetrated a silt and clay layer that acts as an aquitard separating the upper and lower aquifers. The ROD includes excavation and on-site treatment of approximately 4,500 cubic yds. of shallow Hg-contaminated soils including Hg DNAPL. Excavation of deep soils was considered

too difficult, risky and expensive, but the ROD includes a cap and slurry wall tied into a glacial till layer around the former Hg cell bldg., and groundwater pumping to establish an inward gradient. The glacial till layer at about 50' bgs is thought to be acting as a confining layer, and is a potential pathway along which elemental Hg may move beyond the containment area. The ROD states that "elemental Hg DNAPL is perched on silt lenses or the glacial till". The ROD specifies that additional deep borings will be done prior to designing the subsurface barrier wall to evaluate this and ensure that all Hg-o is contained within the barrier wall.

Mercury Refining Superfund Site, Colonie, NY. Contacts: Tom Taccone, RPM, Region 2; x7-4281. Dimitrius Kleridis, CDM; 212-785-9123 x335. In RI/FS stage. Have some data back; expect complete data package in March 2002. Hg processing began in 1956. In 1980s, NYS investigations found Hg-o approximately 25' bgs in an old furnace building area area. But these borings were done by geoprobe, so could have spread Hg to sub-surface. RI/FS studies used split spoon, and found Hg-o beads in same area at 42-46' bgs in silty sands. These borings were advanced to clay layer 60-62' bgs, but no Hg-o was found. The area was paved after NYS investigations in 1980s, and this may have somewhat inhibited Hg-o movement. Contractor stated that based on local conditions, he would expect downward movement of Hg-o, collection above impermeable layers, and movement independent of the direction of GW flow.

LCP Chemicals Site, Glynn County, GA. Reference:
http://www.nucleicassays.com/eco/lcptags/MRSH7ht.html
Hg-o was observed in site soils within the surficial aquifer below an area of the former cell building. Hg-o is confined to the shallow soils due to its difficulty migrating through the small pore spaces in the subsurface.

Recommended course of action for Ventron: As far as we know, Hg-o has not been found in the subsurface at the Ventron Site. However, given that (1) Hg-o was found in surface soils, (2) contaminated soils were disturbed during excavation prior to building the warehouses, (3) borings penetrating to the subsurface were done, (4) several subsurface samples, and GW samples, had fairly high Hg concentrations, and (5) subsurface investigations for the RI/FS in the warehouse area were quite limited, we cannot dismiss the possibility that Hg DNAPL may exist. Furthermore, if it does exist, there is a linear subsurface feature in the warehouse area with sandy soils that could provide a pathway for DNAPL collection and movement beyond the warehouse area.

We have asked NJ to have all surface and subsurface soil samples from the Ventron warehouse area reviewed to determine whether any other samples had free Hg-o, and where. Also, additional subsurface soil borings will be done along the northern perimeter of the warehouse area to the confining layer. Pending these results, for the design phase, we should ensure that data is collected to provide reasonable assurance that Hg DNAPL is not present. We should request additional subsurface delineation in the warehouse area, focusing on the areas of highest GW and soil Hg,

and in the above-noted linear feature.